



QUARTERLY PROGRESS REPORT

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Literature Search	9.04%	\$ 15,000	0.00%	\$ -	100.00%	\$ 15,000
1	Task 1: Comprehensive Literature Review & Policy Analysis	12.06%	\$ 20,000	0.00%	\$ -	100.00%	\$ 20,000
2	Task 2: Selection of Pedestrian Counters	4.52%	\$ 7,500	0.00%	\$ -	100.00%	\$ 7,500
3	Task 3: Select Deployment Sites	3.32%	\$ 5,500	0.00%	\$ -	100.00%	\$ 5,500
4	Task 4: Develop Evaluation Plan	12.42%	\$ 20,600	20.00%	\$ 4,120	100.00%	\$ 20,600
5	Task 5: Implement Evaluation Plan	35.68%	\$ 59,192	15.00%	\$ 8,879	30.00%	\$ 17,758
6	Task 6: Develop Recommendations & Guidelines	17.32%	\$ 28,723	10.00%	\$ 2,872	10.00%	\$ 2,872
7	Task 7: Project Management, Final & Quarterly Reports	5.64%	\$ 9,361	15.00%	\$ 1,404	65.00%	\$ 6,085
	TOTAL	100.00%	\$ 165,876		\$ 17,275		\$ 95,315

Black text is automatically updated or static



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Objective 1: Scanning

- Step 1. Assess current state-of-the art in pedestrian sensors
 - a. Conduct literature review related to the pedestrian counters
 - b. Develop and conduct interviews with a number of States
 - c. Develop Recommendations

Objective 2: PILOT STUDY

- Step 2. Develop experimental set-up
 - i. In close cooperation with NJDOT, select pedestrian counters to be tested.
 - ii. In close cooperation with NJDOT, select sites where field tests will be implemented.
- Step 3. Develop an evaluation plan
- Step 4. Implement the evaluation plan
 - i. Conduct field tests
 - ii. Analyze data
- Step 5. Interpret results of the field evaluation

Objective 3: SYNTHESIS

- Step 1. Develop recommendations and guidelines

Project Abstract:

NJDOT needs to collect **accurate** pedestrian related information in a **cost effective way**. According to the RFP issued by NJDOT, there are key gaps for pedestrian planning and mobility including the “*number of pedestrians using any given sidewalk, path, crosswalk, or other pedestrian facilities*”. The lack of such data is in turn clearly one of the one of the most significant barriers to the development of *safety conscious transportation plans* that includes pedestrians as well as vehicles. The same RFP states two important types of information needed for reliable decision-making:

- 1. better understanding of pedestrian behavior,
- 2. more accurate and complete inventory of pedestrian flow rates.

In the past, pedestrian count information was generally collected manually. However, since the manual collection of accurate pedestrian counts can be quite expensive and time-consuming, this approach is used sporadically and as a result does not yield comprehensive data from which to make informed



CAIT

**Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey**

policy and planning decisions. In fact, because of extensive time and labor requirements of manual data collection, which might also be relatively inaccurate, reliable pedestrian flow information is most of the time not available to the planners and decision makers. In addition to the lack of meaningful pedestrian flow data, other information related to the understanding of “pedestrian behavior” is almost never available. Unfortunately, even the literature is quite limited in terms of this information. Most recently, researchers at the UC Berkeley Safety Center conducted a comprehensive feasibility study along with a pilot test to assess the best ways to collect both types of information namely, flow and behavior (Greene-Roesel et al., 2007). One of the main findings of their report is the fact that automated counters are the most feasible way of collecting pedestrian data that is reliable and statistically significant in terms of its sample size. In turn, this study provides support for the need to assess the feasibility and use of automated pedestrian counters in New Jersey. Such data could fill a key information gap for the lack of this information which is one of the key parts of the overall puzzle for decision makers and planners who would like to consider pedestrian oriented multi-modal transportation options when developing their planning projects.

With the advent of new technologies that make it possible to automatically count and even track pedestrians in a wide variety of settings and transportation facilities, accurate and cost effective data collection has become a possibility. The major goals of this project as also stated in the original RFP can be summarized as follows:

1. Conduct a literature review on this topic and scope out the costs and feasibility of utilizing these technologies in NJ.
2. Create a pilot program where a limited number of automated pedestrian counters are purchased, deployed and field evaluated.
3. Assess the ease of use and value of the data to help the department to make better decisions about the feasibility of “using automated pedestrian counters” at a larger scale in the State.
4. Develop comprehensive yet easy to use guidelines for the deployment of various types of automated counters under various site-specific conditions

5.

1. Progress this quarter by task:

Phase 1- Literature Search: This task is completed.

Phase 2 - Research



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Task 1 Comprehensive Review and Policy Analysis:

1. We completed Task 1. We delivered a final report for Task 1 (combined with the findings of Literature Search of Phase 1).

This task is complete.

Task 2 Select and Recommend Pedestrian Counters To Be Evaluated¹:

1. After a meeting with NJDOT project team and presenting them with the selected counters, the research team decided to acquire two sensors approved by the NJDOT research panel, one for high volume and one for low volume intersections.
2. The purchase orders for both detectors are completed and they are ordered in the fourth quarter. Now, the research team is awaiting for the delivery of the two detectors with an anticipated delivery date of early December. These sensors are:
 - a. High Volume: Thermal camera
 - b. Low Volume: Eco-Twin + Pyro electric sensor

Two sensors namely, EcoCounter and Thermal camera are selected and purchased. This task is complete.

Task 3 Select Deployment Sites:

1. Two sites for the high volume field tests and one site for low volume field test are recommended by the research team and accepted by NJDOT at the fourth quarterly meeting of 2008. These sites are at the Busch campus, New Brunswick train station, and Trenton train station.

Task 4 Develop a Comprehensive Evaluation Plan

1. Based on the review of the guidelines and reports that are previously prepared for the “Intelligent Transportation Systems” field evaluation study, a comprehensive field evaluation / test plan is prepared and finalized. It is currently being implemented. If needed, minor changes will be made to this evaluation plan.

¹ This report is being prepared in February 2009 and some of the tasks are in anticipation of what is expected to happen in March, 2009.



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Task 5 Implement Evaluation Plan

We completed the evaluation of the EcoCounter (low volume sensor) under laboratory and real-world conditions. EcoCounter pedestrian detector was installed on Busch Campus on January 20, 2009. The detector was mounted on a traffic sign near Busch Campus dining hall. The sensor was mounted such that only pedestrian volumes would be counted, and there would not be any interruption due to vehicles. Pedestrian volumes are heavy at this location, approximately 4,000 pedestrians per day, because of students walking between the dining hall, classrooms and dormitories.

We are in the process of comparing sensor counts with ground truth data collected by the Rutgers Team in the RITS lab using recorded pedestrian movements (as of February 25th, 2009). We are anticipating to complete this work and compare sensor data with ground truth data by the end of the first quarter.

We will also test the EcoCounter at a very low volume location to evaluate its performance under less challenging conditions. We plan to accomplish this additional task in the third week of March for a period of several days and report our results.

We will start the field evaluation of the “high volume scenario” in March 5th 2009 at the same location for the purposes of comparing the two sensors. This will be done in close collaboration with the manufacturer of the counter who will install the counter and train the research team. We anticipate to have preliminary results by the end of the first quarter.

Tasks 6: Develop Recommendations and Guidelines

We started our development of recommendations for the low volume counter based on our test results.

Task 7 Project Management, Final and Quarterly Reports”

This is an on-going task that includes all the project management and reporting activities required by the project.

2. Proposed activities for next quarter by task:



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Tasks 5, 6: These three tasks will be underway.

3. List of deliverables provided in this quarter by task (product date):

1. A presentation of the findings of during the previous quarter

4. Progress on Implementation and Training Activities:

1. An on-site training for the installation and the calibration of the thermal camera is scheduled with the manufacturer of the thermal pedestrian counter” is set up for March 5th, 2009.

5. Problems/Proposed Solutions:

We encountered a problem with finding a suitable power source for the thermal counter. This was a problem because the current power source needed to be altered to be compatible with the voltage required by the thermal counter and this had a cost of \$2000. Thus, we decided to use batteries as an alternative that is less expensive and more portable. A steel box that can accommodate both these batteries were ordered. The original New Brunswick location also required permission from the owner of the traffic light and that might cause further delays. We decided to first test the equipment at a less problematic more accessible location namely at the same Busch campus location where we tested the EcoCounter. This location has several advantages 1) the permit for installation the equipment on the pole has already been obtained 2) it has quite a high volume of pedestrian traffic 3) it has been used for the testing of the EcoCounter, thus we will have a chance to compare both sensors under similar pedestrian traffic conditions 4) it is easily accessible by allowing the team to test if the battery based power solution works adequately or not.

Year 1 Budget	\$ 97,455
Years 1 & 2 Cumulative Budget	\$165,876
Years 1, 2 & 3 Cumulative Budget	
Total Project Budget	\$165,876
Modified Contract Amount:	
Total Project Expenditure to date	\$95,315
% of Total Project Budget Expended	57.46%

NJDOT Research Project Manager Concurrence: _____ Date: _____



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	Evaluation of the Automated Distress Survey Equipment		
RFP NUMBER: 2008-07	NJDOT RESEARCH PROJECT MANAGER: Vincent Nichnadowicz		
TASK ORDER NUMBER: TO 224 / RU Acct 4-23382	PRINCIPAL INVESTIGATOR: Carl Rascoe		
Project Starting Date: 05/01/2008 Original Project Ending Date: 07/31/2009 Modified Completion Date:	Period Covered: 1st Quarter 2009		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Conduct Literature Search	2.11%	\$ 3,000.00	0.00%	\$ -	100.00%	\$ 3,000
2	Prepare Distress Identification Manual	9.27%	\$ 13,170.00	0.00%	\$ -	100.00%	\$ 13,170
3	Select Test Sections	24.71%	\$ 35,100.00	0.00%	\$ -	100.00%	\$ 35,100
4	Vendor Selection	5.29%	\$ 7,518.00	0.00%	\$ -	100.00%	\$ 7,518
5	Field Data Collection and Data Analyses	44.96%	\$ 63,850.00	10.00%	\$ 6,385	70.00%	\$ 44,695
6	Quarterly and Final Reports	13.65%	\$ 19,387.00	15.00%	\$ 2,908	45.00%	\$ 8,724
7		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
8		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
9		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
10		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
11		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
12		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
13		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
14		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
15		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
16		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
17		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
18		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
19		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
20		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
	TOTAL	100.0%	\$ 142,025		\$ 9,293		\$ 112,207

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Project Objectives:

Since there are multiple vendors with this type of equipment, the Department would like to evaluate and compare these units in a side-by-side pilot for the next generation Pavement Management System data collection vehicle. The evaluation of the Automated Distress Survey Equipment to supplement or replace the current manual visual distress data collection could significantly improve the quality and repeatability of the PMS distress data and help the Department make better pavement rehabilitation decisions. This is especially important in this time of limited financial resources.

The objectives of this research study are to:

- Evaluate the capabilities, limitations, and repeatability of the various automated distress survey equipment technologies on various distress types on different pavement surfaces types at various distress severity levels, lighting conditions and highway speeds.
- Assess the capabilities, limitations, and repeatability of the Department's PMS rater staff on various distress types on different pavement surfaces types at various distress severity levels, lighting conditions and highway speeds.
- Assess the level of effort and time required to process the images from the automated distress survey equipment
- Determine which types of distress are better collected with the automated distress survey equipment and which distress types should continue to be collected by PMS staff.
- Determine how the data collected by the automated distress data collection equipment can be incorporated into the pavement management system.

Project Abstract:

In order to address the research objectives, the research team will conduct a comprehensive literature search to summarize the manufacture's description of the distress data collection technology and other research conducted to assess the current state-of-the-art in pavement imaging and distress identification and evaluation. The research team will meet with the PMS staff to identify 15 one-mile test sections that have a variety of pavement types (BC, CO, and RC), distress types, severity levels and extents. The team will review the Department's current distress survey protocol and develop distress definitions, and evaluation criteria for use in the research study. Based on the content of the literature search and experience of the research team, a number of automated distress survey equipment vendors representing the various distress collection technologies will be identified. These vendors will be contracted to collect three runs on each test sites in one day and conduct analyses of the image data at NJ DOT.

The PMS staff will also collect distress data using the current protocol. The testing order of the test sites will be randomly assigned. The distress type, severity and extent levels of each site will be documented for comparison between the automated distress survey equipment and the PMS raters.



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Progress this quarter by task:

1. The CAIT team worked with the Dynatest team and Kelvin Wang (Waylink) to prepare the cracking data from the distress data on the test sites. The data will be delivered and analyzed in the next quarter.

2. Proposed activities for next quarter by task:

The CAIT research team will develop a methodology for utilizing the automated distress data into the Department's SDI_m.

3. List of deliverables provided in this quarter by task (product date):

4. Progress on Implementation and Training Activities:

5. Problems/Proposed Solutions:

Year 1 Budget	\$142,025
Years 1 & 2 Cumulative Budget	
Years 1, 2 & 3 Cumulative Budget	
Total Project Budget	\$142,025
Modified Contract Amount:	
Total Project Expenditure to date	\$112,207
% of Total Project Budget Expended	79%

NJDOT Research Project Manager Concurrence: _____ Date: _____



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	Self Cleaning and De-Polluting Geopolymer Coatings for Graffiti Prevention and Removal-Demo Project		
RFP NUMBER: 200X-XXX	NJDOT RESEARCH PROJECT MANAGER: Robert Sasor		
TASK ORDER NUMBER: TO 211 / RU Acct 4-28959	PRINCIPAL INVESTIGATOR: Dr. P. Balaguru		
Project Starting Date: 10/15/2007 Original Project Ending Date: 10/15/2008 Modified Completion Date: 10/15/09	Period Covered: 1 st Quarter 2009		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Literatuare Search	5.12%	\$ 5,123	0.00%	\$ -	100.00%	\$ 5,123
2	Self Cleaning & Depolluting Study	28.00%	\$ 28,000	15.00%	\$ 4,200	75.00%	\$ 21,000
3	Coating Color & Field Application -A-	6.00%	\$ 6,000	5.00%	\$ 300	95.00%	\$ 5,700
4	Coating Color and Field Application -B-	6.00%	\$ 6,000	25.00%	\$ 1,500	100.00%	\$ 6,000
5	Graffiti Removal Method	24.50%	\$ 24,500	10.00%	\$ 2,450	50.00%	\$ 12,250
6	Geopolymer Cost Estimate	1.50%	\$ 1,500	0.00%	\$ -	0.00%	\$ -
7	Compare Geopolymer to Other Coatings	3.50%	\$ 3,500	0.00%	\$ -	0.00%	\$ -
8	Develop Generic Specification	3.00%	\$ 3,000	0.00%	\$ -	0.00%	\$ -
9	Field Demostration of Graffiti Removal	5.00%	\$ 5,000	10.00%	\$ 500	60.00%	\$ 3,000
10	Monitor Coating Long Term	6.00%	\$ 6,000	10.00%	\$ 600	30.00%	\$ 1,800
11	Final Re[p]rt and Quarterly Reporting	8.88%	\$ 8,877	0.00%	\$ -	0.00%	\$ -
12	Training and Implementation Plan	2.50%	\$ 2,500	10.00%	\$ 250	20.00%	\$ 500
13		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
14		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
15		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
16		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
17		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
18		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
19		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
20		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
	TOTAL	100.00%	\$ 100,000		\$ 9,800		\$ 55,373

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Project Objectives:

The primary objective of the proposed study is to demonstrate the effectiveness of the inorganic coating for graffiti prevention and removal. Since other formulations are available in the market, the study will have the following components.

- (1) Field demonstration of the inorganic coating for graffiti prevention and removal, and
- (2) Cost comparison of this coating with other available products, for both initial application and maintenance, based on the cost for graffiti removal.

In addition, laboratory and field studies will be conducted to document properties pertaining to:

- (3) Self cleaning, and
- (4) De-pollution.

Project Abstract:

A site has been selected for the demonstration application and testing of graffiti removal. It is a retaining wall located on a ramp from Route 1 North to the Woodbridge Mall. The wall is about 200 feet long and has an average height of about 7 feet and is easily accessible. Since the surface to be coated faces a parking lot, traffic control is not needed and sufficient space is available for both application of the coating and tests for graffiti removal. The wall and four concrete boards will be coated with the inorganic coating. Two concrete boards will be brought to the laboratory for evaluating the most efficient graffiti removal techniques and for studying self cleaning and de-pollution properties. The other two concrete boards will be kept outside the lab to test for outdoor exposure.

In addition, a specification will be prepared for using the geopolymer coating as an anti-graffiti, self cleaning and de-polluting surface treatment. A performance and cost comparison study between this coating material and other commercially available products will also be conducted.

1. Progress this quarter by task:

The primary focus was self cleaning and de-pollution studies. We are also monitoring the coatings.

2. Proposed activities for next quarter by task:

Evaluate steam for graffiti removal techniques
Continue the self cleaning and de-pollution study.

3. List of deliverables provided in this quarter by task (product date):

None

4. Progress on Implementation and Training Activities:

None

5. Problems/Proposed Solutions:



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Year 1 Budget	\$58,123
Years 1 & 2 Cumulative Budget	\$100,000
Years 1, 2 & 3 Cumulative Budget	
Total Project Budget	\$100,000
Modified Contract Amount:	
Total Project Expenditure to date	\$ 55,373
% of Total Project Budget Expended	55.37%

NJDOT Research Project Manager Concurrence: _____ Date: _____



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	Dynamic Modulus of Hot Mix Asphalt		
RFP NUMBER: 2003-10	NJDOT RESEARCH PROJECT MANAGER: Camille Crichton-Sumners		
TASK ORDER NUMBER: TO 199 / RU Acct 4-26619	PRINCIPAL INVESTIGATOR: Ali Maher/Thomas Bennert		
Project Starting Date: 01/01/2007 Original Project Ending Date: 12/31/2008 Modified Completion Date: 6/30/2009	Period Covered: 1 st Quarter 2009		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	11.19%	\$ 25,000	0.0%	\$ -	100.0%	\$ 25,000
2	Literature Search	2.24%	\$ 5,000	0.0%	\$ -	100.0%	\$ 5,000
3	Develop Test Plan	2.24%	\$ 5,000	0.0%	\$ -	100.0%	\$ 5,000
4	Conduct E* Testing and Database Development	26.85%	\$ 60,000	5.0%	\$ 3,000	100.0%	\$ 60,000
5	Compare Measured E* to Predicted E*	8.43%	\$ 18,835	5.0%	\$ 942	100.0%	\$ 18,835
6	Conduct Sensitivity Analysis of E*	15.66%	\$ 35,000	0.0%	\$ -	100.0%	\$ 35,000
7	Conduct Round Robin Testing	11.24%	\$ 25,117	0.0%	\$ -	100.0%	\$ 25,117
8	Develop Final Database	7.83%	\$ 17,500	5.0%	\$ 875	100.0%	\$ 17,500
9	Final Report and Quarterly Reporting	14.32%	\$ 32,032	10.0%	\$ 3,203	95.0%	\$ 30,430
10		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
11		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.00%	\$ 223,484		\$ 8,020		\$ 221,882

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Project Objectives:

The objective of the research project is to provide the NJDOT with a clear understanding of the dynamic modulus test and its precision, the typical E^* values of their native HMA materials, and the accuracy of the prediction equations that are proposed for use in the MEPDG.

Project Abstract:

The most critical parameter needed for the upcoming Mechanistic Empirical Pavement Design Guide (MEPDG) is the dynamic modulus (E^*), which will be used for flexible pavement design. The dynamic modulus represents the stiffness of the asphalt material when tested in a compressive-type, repeated load test. The dynamic modulus will be the key parameter used to evaluate both rutting and fatigue cracking. The computer software that will accompany the MEPDG will provide general default parameters for the dynamic modulus. However, caution has already been issued by the National Cooperative Highway Research Program (NCHRP) researchers as to the appropriateness of these parameters for regional areas. The major concern is that state agencies will use these default values blindly and sacrifice accuracy of the design. Hence, making the new mechanistic procedure no better than using a structural number (SN) with the old AASHTO method.

To ensure that the New Jersey Department of Transportation (NJDOT) will be prepared for the upcoming design procedure, a research proposal has been developed. The research proposal will encompass evaluating the dynamic modulus of approximately twenty different hot mix asphalt designs that are currently specified by the NJDOT. The dynamic modulus will be determined based on the most current testing protocol (AASHTO TP62). The dynamic modulus (E^*) will be represented using a technique called a *master curve*. The E^* master curve is a single curve that represents the asphalt materials stiffness relationship to loading frequency and temperature. The master curve for each material tested will be developed and its sigmoidal curve fitting parameters (α , β , γ , δ) determined. This procedure is called Level I for the MEPDG and will provide the most realistic results during design. The measured E^* values will be compared to that of the Witczak predictive equation and the Hirsch model. The Witczak predictive equation has been selected by the NCHRP researchers for the Level II and III design. The Level II will provide accurate results, although not as accurate as actually measuring the E^* in the laboratory. The predictive equation is based on the mix gradation, asphalt binder viscosity properties, and volumetric properties of the hot mix asphalt. The accuracy of the predictive equation will be determined, as well as possible methods to “shift” the predictive equation to more closely represent New Jersey materials.

Another important aspect of the research project is the development of a “precision-type statement” for use by the NJDOT regarding the dynamic modulus test. Currently, a precision statement does not exist regarding multiple laboratories. Eight laboratories were contacted and asked to participate in a round robin study regarding the dynamic modulus test. All laboratories are AMRL accredited for hot mix asphalt and will provide valuable information regarding the expected precision the NJDOT can expect if dynamic modulus testing is to be conducted by outside laboratories.



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

1. Progress this quarter by task:

Testing has been completed on the remaining asphalt mixtures sampled at the end of 2008. Analysis is finishing on these mixture for inclusion in the E* database, as well for the comparisons between the measured results and the prediction equations.

Further refinement has been completed on the handout materials for the NJDOT MEPDG Materials Input training class that will be used in conjunction with the NJDOT E* Catalog.

2. Proposed activities for next quarter by task:

Complete final report for submittal.

3. List of deliverables provided in this quarter by task (product date):

NA

4. Progress on Implementation and Training Activities:

NA

5. Problems/Proposed Solutions:

NA

Year 1 Budget	\$223,484
Years 1 & 2 Cumulative Budget	
Years 1, 2 & 3 Cumulative Budget	
Total Project Budget	\$223,484
Modified Contract Amount:	
Total Project Expenditure to date	\$221,882
% of Total Project Budget Expended	99.3%

NJDOT Research Project Manager Concurrence: _____ Date: _____



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	New Jersey State LTAP Technology Transfer Center (FHWA) 2008		
RFP NUMBER:		NJDOT RESEARCH PROJECT MANAGER: W. Lad Szalaj	
TASK ORDER NUMBER: TO 230 / Acct 4-30745		PRINCIPAL INVESTIGATOR: Dr. Ali Maher	
Project Starting Date: 01/01/2009 Original Project Ending Date: 12/31/2009		Period Covered: 1 st Quarter 2009	

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization		\$ -	0.00%	\$ -	0.00%	\$ -
2	Safety Focus Area	23.76%	\$ 73,264	40.00%	\$ 29,306	40.00%	\$ 29,306
3	Infrastructure Management Focus Area	26.63%	\$ 67,289	30.00%	\$ 20,187	30.00%	\$ 20,187
4	Workforce Development Focus Area	25.21%	\$ 55,290	20.00%	\$ 11,058	20.00%	\$ 11,058
5	Organizational Excellence	24.40%	\$ 44,157	25.00%	\$ 11,039	25.00%	\$ 11,039
6		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
7		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
8		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
9		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
10		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
11		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
12		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
13		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
14		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
15		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
16		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
17		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
18		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
19		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
20		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
	TOTAL	100.00%	\$ 240,000		\$ 71,590		\$ 71,590

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Project Objectives:

The New Jersey Local Technical Assistance Program (LTAP) has a mission to become an information clearinghouse to foster a safe, efficient, environmentally sound transportation system by improving the skills and knowledge of the transportation industry through technology transfer activities, such as training, technical assistance and dissemination of resources.

The objectives of this project are to continue to diversify and expand the customer base, deliver quality customer service, communicate the program values to partners and clients, and enhance the technology transfer network, through the activities of the New Jersey Local Technical Assistance Program (LTAP).

Project Abstract:

The Center for Advanced Infrastructure and Transportation (CAIT), located at Rutgers University, is submitting this proposal for the continuation of the New Jersey Local Technical Assistance Program (NJ LTAP). NJ LTAP will conduct technology transfer activities that include the dissemination of information through a monthly newsletter, conducting training programs, and administering clearinghouse activities. This ongoing effort provides public works, engineering, planning, and law enforcement employees with training and information in the areas of design, maintenance, inspection, supervision, employee development, and other transportation related subjects. NJ LTAP will also support and provide services to the transportation research community in cooperation with the New Jersey Department of Transportation.

Recently, FHWA has revised the LTAP/TTAP focus areas and performance measures to better reflect a continuous cycle of improvement. Performance measures, formerly known as tasks, will be used in 2009 to assess safety, workforce development, infrastructure management, and organizational excellence. This approach will provide an opportunity to continually reassess the customer base and value in each focus area.



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Center Name: New Jersey Local Technical Assistance Program

Reporting Period: January 1, 2009 to March 31, 2009

Program Dashboard

Total number of training sessions:	<u>40</u>
Total number of participants:	<u>1,916</u>
Total number of participant hours:	<u>15,185.5</u>
Total newsletter circulation:	<u>11,439</u>
Total number of LTAP/TTAP FTEs:	<u>2.5</u>

Training Data

Safety

The Safety metric is divided into 2 categories: Highway Safety and Worker/Workplace Safety. Count the training your center conducted or had responsibility for conducting, such as training co-sponsored with a partner.

Highway and Worker Safety

Session Name	Session Length [hours]	Total # of Sessions	Total # of participants					Total # of Participants	Total Participant Hours
			Local	Tribal	State	Federal	Other		
Work Zone Safety Awareness Program	6	3	4		30		75	109	654
Safe Passages Conference	7	1	177		62	5	45	289	2,023
Traffic Control Coordinator Program	32	7	3		33		146	182	5,824
Traffic Control Coordinator Refresher Workshop	4	1	1				46	47	188
Road Safety Audit for Locals Workshop	7	1	14				11	25	175
Municipal Engineering Work Zone Safety	2	2	11				23	32	64



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

NJTR-1 Motor Carrier Refresher	4.5	3	78		27			105	472.5
Signal Warrants at Intersections Near Highway-Railroad Grade Crossings	1.5	1	5		2		70	63	94.5
TOTAL	63	19	293		154	5	416	852	9,516

Infrastructure Management

Session Name	Session Length [hours]	Total # of Sessions	Total # of participants					Total # of Participants	Total Participant Hours
			Local	Tribal	State	Federal	Other		
Asphalt Plant Technician Level One	36	1			11		8	19	684
Asphalt Plant Superpave Technician Level Two	32	1			9		9	18	576
Sustainable Transportation in a Changing Environment	4	1			79		13	92	368
Municipal Engineering Underground Conduit Construction	3	2	11				23	34	102
Municipal Engineering Embankment, Subgrade and Foundations	3	2	11				23	34	102
Municipal Engineering Asphalt Construction	3	2	11				23	34	102
Municipal Engineering Portland Cement Concrete	3	2	11				23	34	102
Rutgers Annual Paving Conference	5	2						500	2,500
An Overview of the Port Authority's Plan to redevelop Stewart Airport	1.5	1	3		4		24	31	46.5
Design of Transit-Oriented Developments	1.5	1	5		5		68	78	117
TOTAL	92	15	52		88		214	874	4,699.5



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Workforce Development

Session Name	Session Length [hours]	Total # of Sessions	Total # of participants					Total # of Participants	Total Participant Hours
			Local	Tribal	State	Federal	Other		
Municipal Engineering Contract Documents	7	1	11				23	34	238
Municipal Engineering Regulatory Agencies	4	2	11				21	32	128
Municipal Engineering Inspection Records and Duties	3	2	11				23	34	102
Supply Chain Management Career Primer	7	1						76	532
TOTAL	21	6	33				87	176	1,000

Newsletter / Published Resources Data

Circulation

Name of Newsletter	Circulation				
	Local	Tribal	State	Federal	Other
LTAP E-News	1,860	8	920	161	764

Number of Articles per Focus Area

Newsletter Issue	Safety			Workforce Development	Infrastructure Management
	Highway	Worker	Work Zone		
Volume 11, Number 01	3			2	5
Volume 11 Number 02	1	1	1	2	2
Volume 11, Number 03	2	1	1	2	4



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Materials Distribution Data

Material Types	Safety			Workforce Development	Infrastructure Management
	Highway	Worker	Work Zone		
Publications	380		1460	132	723
CDs	250				
Videotapes					
DVDs					
Downloads					
Others [insert]					
TOTAL:					

Technical Assistance Data

Estimate the total percentage of time spent by your Center staff providing technical assistance during the past quarter: **40%**

Activities Related to Program Stakeholders

Organization	Activities					
	# of times center distributed information for this organization (mail, e-mail, fax, etc.)	# of joint training sessions	# of joint conferences	# of joint special programs	# of articles reprinted in LTAP/TTAP newsletters from this organization	# of center staff participating in national program efforts
National Stakeholders						
FHWA (HQ, Resource Center)	8				5	2
AASHTO					1	1
NACE	2				2	1
APWA	2				7	1
TRB						1
Salt Institute						1
State/Local Stakeholders						
FHWA Division						2
State DOT/govt	1	14		1		3



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

AASHTO Chapter						
NACE Chapter						1
APWA Chapter	4					1
ITE						2
Other Stakeholders						
NJ Society of Municipal Engineers	2	12				2
NJ Div of Highway Traffic Safety	2		1		1	2
NJ Asphalt Pavement Assoc.	2		1			1
NJ WZS Partnership		14			1	2

1. Progress this quarter by task, with specific deliverables:

A. Safety Focus Area

19 Workshops
2,090 Resources Distributed

B. Infrastructure Management Focus Area

15 Workshops
723 Resources Distributed

C. Workforce Development Focus Area

6 Workshops
132 Resources Distributed



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

D. Organizational Excellence

Transportation Research Board Meeting	January 11-12, 2009
National LTAP Association Winter Meeting	January 11, 2009
NLTAPA Executive Committee Meeting	January 11, 2009
NLTAPA Safety Work Group Conference Call	January 11, 2009
TRB Tech Transfer Committee Meeting	January 12, 2009
NJ Work Zone Safety Partnership Meeting	January 15, 2009
County & Municipal Traffic Engineers Association Meeting	February 3, 2009
NLTAPA Executive Committee Meeting	February 9, 2009
Exhibit at Safe Passages Conference	February 10, 2009
APWA NJ Chapter Annual Meeting	February 11, 2009
NJ Association of County Engineers Meeting	February 20, 2009
NLTAPA Conference Committee Conference Call	February 26, 2009
NLTAPA Safety Work Group Conference Call	March 9, 2009
NLTAPA Executive Committee Meeting	March 16, 2009
APWA NJ Chapter Annual Meeting	March 18, 2009
NJ Association of County Engineers Meeting	March 20, 2009
Course/Workshop Evaluations	Ongoing
Technical Assistance	Ongoing
New Website Launch	January 2009
Online Registration System Pilot	February 2009

2. Progress on Implementation and Training Activities:

All of the activities of this technology transfer project, and their implementation dates are included above.

3. Problems/Proposed Solutions:

Year 1 Budget	\$240,000
Years 1 & 2 Cumulative Budget	
Years 1, 2 & 3 Cumulative Budget	
Total Project Budget	\$240,000
Modified Contract Amount:	\$
Total Project Expenditure to date	\$71,590
% of Total Project Budget Expended	29.83%

NJDOT Research Project Manager Concurrence: _____ Date: _____

100 BRETT RD. PISCATAWAY NJ 08854-8058
TEL: 732-445-0579 FAX: 732-445-3325



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	New Jersey State LTAP Technology Transfer Center (STATE) 2008		
RFP NUMBER:		NJDOT RESEARCH PROJECT MANAGER: W. Lad Szalaj	
TASK ORDER NUMBER: TO 230 / Acct 4-30761		PRINCIPAL INVESTIGATOR: Dr. Ali Maher	
Project Starting Date: 01/01/2009 Original Project Ending Date: 12/31/2009 Modified Completion Date:		Period Covered: 1 st Quarter 2009	

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization		\$ -	0.00%	\$ -	0.00%	\$ -
2	Safety Focus Area	23.76%	\$ 10,000	40.00%	\$ 4,000	40.00%	\$ 4,000
3	Infrastructure Management Focus Area	26.63%	\$ 10,000	30.00%	\$ 3,000	30.00%	\$ 3,000
4	Workforce Development Focus Area	25.21%	\$ 10,000	20.00%	\$ 2,000	20.00%	\$ 2,000
5	Organizational Excellence	24.40%	\$ 10,000	25.00%	\$ 2,500	25.00%	\$ 2,500
6		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
7		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
8		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
9		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
10		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
11		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
12		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
13		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
14		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
15		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
16		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
17		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
18		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
19		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
20		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
	TOTAL	100.00%	\$ 40,000		\$ 11,500		\$ 11,500

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Project Objectives:

The New Jersey Local Technical Assistance Program (LTAP) has a mission to become an information clearinghouse to foster a safe, efficient, environmentally sound transportation system by improving the skills and knowledge of the transportation industry through technology transfer activities, such as training, technical assistance and dissemination of resources.

The objectives of this project are to continue to diversify and expand the customer base, deliver quality customer service, communicate the program values to partners and clients, and enhance the technology transfer network, through the activities of the New Jersey Local Technical Assistance Program (LTAP).

Project Abstract:

The Center for Advanced Infrastructure and Transportation (CAIT), located at Rutgers University, is submitting this proposal for the continuation of the New Jersey Local Technical Assistance Program (NJ LTAP). NJ LTAP will conduct technology transfer activities that include the dissemination of information through a monthly newsletter, conducting training programs, and administering clearinghouse activities. This ongoing effort provides public works, engineering, planning, and law enforcement employees with training and information in the areas of design, maintenance, inspection, supervision, employee development, and other transportation related subjects. NJ LTAP will also support and provide services to the transportation research community in cooperation with the New Jersey Department of Transportation.

Recently, FHWA has revised the LTAP/TTAP focus areas and performance measures to better reflect a continuous cycle of improvement. Performance measures, formerly known as tasks, will be used in 2009 to assess safety, workforce development, infrastructure management, and organizational excellence. This approach will provide an opportunity to continually reassess the customer base and value in each focus area.



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Center Name: New Jersey Local Technical Assistance Program

Reporting Period: January 1, 2009 to March 31, 2009

Program Dashboard

Total number of training sessions:	<u>40</u>
Total number of participants:	<u>1,916</u>
Total number of participant hours:	<u>15,185.5</u>
Total newsletter circulation:	<u>11,439</u>
Total number of LTAP/TTAP FTEs:	<u>2.5</u>

Training Data

Safety

The Safety metric is divided into 2 categories: Highway Safety and Worker/Workplace Safety. Count the training your center conducted or had responsibility for conducting, such as training co-sponsored with a partner.

Highway and Worker Safety

Session Name	Session Length [hours]	Total # of Sessions	Total # of participants					Total # of Participants	Total Participant Hours
			Local	Tribal	State	Federal	Other		
Work Zone Safety Awareness Program	6	3	4		30		75	109	654
Safe Passages Conference	7	1	177		62	5	45	289	2,023
Traffic Control Coordinator Program	32	7	3		33		146	182	5,824
Traffic Control Coordinator Refresher Workshop	4	1	1				46	47	188
Road Safety Audit for Locals Workshop	7	1	14				11	25	175
Municipal Engineering Work Zone Safety	2	2	11				23	32	64



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

NJTR-1 Motor Carrier Refresher	4.5	3	78		27			105	472.5
Signal Warrants at Intersections Near Highway-Railroad Grade Crossings	1.5	1	5		2		70	63	94.5
TOTAL	63	19	293		154	5	416	852	9,516

Infrastructure Management

Session Name	Session Length [hours]	Total # of Sessions	Total # of participants					Total # of Participants	Total Participant Hours
			Local	Tribal	State	Federal	Other		
Asphalt Plant Technician Level One	36	1			11		8	19	684
Asphalt Plant Superpave Technician Level Two	32	1			9		9	18	576
Sustainable Transportation in a Changing Environment	4	1			79		13	92	368
Municipal Engineering Underground Conduit Construction	3	2	11				23	34	102
Municipal Engineering Embankment, Subgrade and Foundations	3	2	11				23	34	102
Municipal Engineering Asphalt Construction	3	2	11				23	34	102
Municipal Engineering Portland Cement Concrete	3	2	11				23	34	102
Rutgers Annual Paving Conference	5	2						500	2,500
An Overview of the Port Authority's Plan to redevelop Stewart Airport	1.5	1	3		4		24	31	46.5
Design of Transit-Oriented Developments	1.5	1	5		5		68	78	117
TOTAL	92	15	52		88		214	874	4,699.5



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Workforce Development

Session Name	Session Length [hours]	Total # of Sessions	Total # of participants					Total # of Participants	Total Participant Hours
			Local	Tribal	State	Federal	Other		
Municipal Engineering Contract Documents	7	1	11				23	34	238
Municipal Engineering Regulatory Agencies	4	2	11				21	32	128
Municipal Engineering Inspection Records and Duties	3	2	11				23	34	102
Supply Chain Management Career Primer	7	1						76	532
TOTAL	21	6	33				87	176	1,000

Newsletter / Published Resources Data

Circulation

Name of Newsletter	Circulation				
	Local	Tribal	State	Federal	Other
LTAP E-News	1,860	8	920	161	764

Number of Articles per Focus Area

Newsletter Issue	Safety			Workforce Development	Infrastructure Management
	Highway	Worker	Work Zone		
Volume 11, Number 01	3			2	5
Volume 11, Number 02	1	1	1	2	2
Volume 11, Number 03	2	1	1	2	4



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Materials Distribution Data

Material Types	Safety			Workforce Development	Infrastructure Management
	Highway	Worker	Work Zone		
Publications	380		1460	132	723
CDs	250				
Videotapes					
DVDs					
Downloads					
Others [insert]					
TOTAL:					

Technical Assistance Data

Estimate the total percentage of time spent by your Center staff providing technical assistance during the past quarter: **40%**

Activities Related to Program Stakeholders

Organization	Activities					
	# of times center distributed information for this organization (mail, e-mail, fax, etc.)	# of joint training sessions	# of joint conferences	# of joint special programs	# of articles reprinted in LTAP/TTAP newsletters from this organization	# of center staff participating in national program efforts
National Stakeholders						
FHWA (HQ, Resource Center)	8				5	2
AASHTO					1	1
NACE	2				2	1
APWA	2				7	1
TRB						1
Salt Institute						1
State/Local Stakeholders						
FHWA Division						2
State DOT/govt	1	14		1		3



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

AASHTO Chapter						
NACE Chapter						1
APWA Chapter	4					1
ITE						2
Other Stakeholders						
NJ Society of Municipal Engineers	2	12				2
NJ Div of Highway Traffic Safety	2		1		1	2
NJ Asphalt Pavement Assoc.	2		1			1
NJ WZS Partnership		14			1	2

1. Progress this quarter by task, with specific deliverables:

A. Safety Focus Area

19 Workshops
2,090 Resources Distributed

B. Infrastructure Management Focus Area

15 Workshops
723 Resources Distributed

C. Workforce Development Focus Area

6 Workshops
132 Resources Distributed



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

D. Organizational Excellence

Transportation Research Board Meeting	January 11-12, 2009
National LTAP Association Winter Meeting	January 11, 2009
NLTAPA Executive Committee Meeting	January 11, 2009
NLTAPA Safety Work Group Conference Call	January 11, 2009
TRB Tech Transfer Committee Meeting	January 12, 2009
NJ Work Zone Safety Partnership Meeting	January 15, 2009
County & Municipal Traffic Engineers Association Meeting	February 3, 2009
NLTAPA Executive Committee Meeting	February 9, 2009
Exhibit at Safe Passages Conference	February 10, 2009
APWA NJ Chapter Annual Meeting	February 11, 2009
NJ Association of County Engineers Meeting	February 20, 2009
NLTAPA Conference Committee Conference Call	February 26, 2009
NLTAPA Safety Work Group Conference Call	March 9, 2009
NLTAPA Executive Committee Meeting	March 16, 2009
APWA NJ Chapter Annual Meeting	March 18, 2009
NJ Association of County Engineers Meeting	March 20, 2009
Course/Workshop Evaluations	Ongoing
Technical Assistance	Ongoing
New Website Launch	January 2009
Online Registration System Pilot	February 2009

2. Progress on Implementation and Training Activities:

All of the activities of this technology transfer project, and their implementation dates are included above.

3. Problems/Proposed Solutions:

Year 1 Budget	\$40,000
Years 1 & 2 Cumulative Budget	
Years 1, 2 & 3 Cumulative Budget	
Total Project Budget	\$40,000
Modified Contract Amount:	\$
Total Project Expenditure to date	\$11,500
% of Total Project Budget Expended	28.75%

NJDOT Research Project Manager Concurrence: _____ Date: _____

100 BRETT RD. PISCATAWAY NJ 08854-8058
TEL: 732-445-0579 FAX: 732-445-3325



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	In Place Rehabilitation of Pipes Using Polymer Composites: Demo Project		
RFP NUMBER: 200X-XXX	NJDOT RESEARCH PROJECT MANAGER: Lad Szalaj		
TASK ORDER NUMBER: TO 233 / RU Acct 4-30744	PRINCIPAL INVESTIGATOR: Perumalsamy Balaguru		
Project Starting Date: 11/17/2008 Original Project Ending Date: 11/17/2010 Modified Completion Date:	Period Covered: 1 st Quarter 2009		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Completion of Demo Project	75.00%	\$ 22,000	5.00%	\$ 1,100	5.00%	\$ 1,100
2	Report on Performance	20.00%	\$ 7,000	0.00%	\$ -	0.00%	\$ -
3	Quarterly and Final Reporting	5.00%	\$ 1,360	0.00%	\$ -	0.00%	\$ -
4		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
5		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
6		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
7		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
8		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
9		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
10		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
11		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
12		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
13		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
14		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
15		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
16		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
17		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
18		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
19		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
20		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
	TOTAL	100.00%	\$ 30,360		\$ 1,100		\$ 1,100

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static

Project Objectives:

To rehabilitate two clay pipes using composites

Project Abstract:

abstract

1. Progress this quarter by task:

100 BRETT RD. PISCATAWAY NJ 08854-8058
TEL: 732-445-0579 FAX: 732-445-3325



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Did literature survey on repairing pipes that are about 24 in. diameter.

2. Proposed activities for next quarter by task:

Complete some repair in the lab for simulation.

3. List of deliverables provided in this quarter by task (product date):

None

4. Progress on Implementation and Training Activities:

None

5. Problems/Proposed Solutions:

None

Total Project Budget	\$30,360
Modified Contract Amount:	
Total Project Expenditure to date	\$1,100
% of Total Project Budget Expended	3.62%

NJDOT Research Project Manager Concurrence: _____ Date: _____



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	Stormwater System Monitoring and Evaluation		
RFP NUMBER: 2007-10	NJDOT RESEARCH PROJECT MANAGER: Edward Kondrath		
TASK ORDER NUMBER: TO 200 / RU Acct 4-28300	PRINCIPAL INVESTIGATOR: Dr. Qizhong (George) Guo		
Project Starting Date: 01/01/2007 Original Project Ending Date: 12/31/2008 Modified Completion Date: 06/30/2009	Period Covered: 1 th Quarter 2009		

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	1.61%	\$ 3,000	0.0%	\$ -	100.0%	\$ 3,000
2	Pre Literature Search	1.61%	\$ 3,000	0.0%	\$ -	100.0%	\$ 3,000
3	1. LITERATURE SEARCH	6.99%	\$ 13,000	0.0%	\$ -	100.0%	\$ 13,000
4	2. TECHNICAL PANEL	5.37%	\$ 10,000	0.0%	\$ -	100.0%	\$ 10,000
5	3. THREE REGIONS	8.60%	\$ 16,000	0.0%	\$ -	100.0%	\$ 16,000
6	4. REPRESENTATIVE DEVICES	5.37%	\$ 10,000	0.0%	\$ -	100.0%	\$ 10,000
7	5. PRE-MONITORING CLEAN-OUT	5.37%	\$ 10,000	0.0%	\$ -	100.0%	\$ 10,000
8	6. MONITORING AND ANALYSIS	40.31%	\$ 75,000	15.0%	\$ 11,250	70.0%	\$ 52,500
9	7. MAINTENANCE GUIDANCE	6.99%	\$ 13,000	0.0%	\$ -	0.0%	\$ -
10	8. Final Report and Quarterly Reporting	17.78%	\$ 33,080	5.0%	\$ 1,654	20.0%	\$ 6,616
11		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.00%	\$ 186,080		\$ 12,904		\$ 124,116

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Project Objectives:

1. Monitor the amounts of sediment, oil, grease, and buoyant debris that would be actually trapped in the stormwater treatment system units installed by NJDOT.
2. Relate the trapped amounts of sediment, oil, grease, and buoyant debris to highway drainage area characteristics.
3. Provide NJDOT with quantitative guidance on the maintenance/cleanup schedule and measures to reduce maintenance/cleanup frequency.

Project Abstract:

To improve the quality of highway runoff and meet the new stormwater management requirements, the New Jersey Department of Transportation (NJDOT) has installed numerous prefabricated stormwater treatment systems throughout the state produced by a range of manufacturers. The use of such systems, known as Manufactured Treatment Devices (MTDs), is expected to continue in the foreseeable future. As the responsible party for the maintenance of these MTDs, NJDOT is interested in determining optimum maintenance intervals and expected maintenance costs for the range of MTDs utilized by the Department. This project will monitor and document maintenance procedures, intervals, and costs for a representative range of MTDs.

1. Progress this quarter by task:

Task 6 (monitoring and evaluation) was continued. The monitoring and evaluation was expanded to include the time period prior to the “pre-monitoring cleanout.” Quantification of physical and chemical characteristics of the “pre-monitoring cleanout materials” was completed. Observations about the sites including type and amount of gross solids on the ground, soil type, land use type, traffic volume were continued. The selected and cleaned 12 treatment devices have continued to be monitored including measurements of the sediment and floatables depths inside the devices.

Design info such as drainage areas and constructions plans was continued to be collected and analyzed. The engineered drainage networks were evaluated.

2. Proposed activities for next quarter by task:

Task 6 (monitoring and evaluation) will be continued. This period of post-cleanout monitoring and evaluation was planned to be for one full year. By end of the next quarter, all the devices would have been monitored for one full year. The maintenance guidance will be started to be developed.

3. List of deliverables provided in this quarter by task (product date):

None.

4. Progress on Implementation and Training Activities:



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

- 1) The NJDOT maintenance personnel were involved in the actual cleanout of the devices. The NJDOT maintenance personnel as well as the contractors gained the valuable field maintenance experience.
- 2) Early observations and suggestions on maintenance accessibility and interval were provided to NJDOT. The NJDOT was suggested to add manufactured treatment devices into the highway database such as the "Straight Line Diagrams," to additionally consider device accessibility during design and construction despite other constraints, and to minimize the amount of gross solids that would enter the devices.
- 3) A device inspection form was made and provided to NJDOT Maintenance Division for their use.
- 4) A field trip was organized for the NJDOT personnel to Montgomery County, Maryland on June 5, 2008 to observe their maintenance program on stormwater manufactured treatment devices.
- 5) Progress of the project and early observations and recommendations were presented at the NJDOT Research Showcase on November 28, 2007 as well as on October 16, 2008.

5. Problems/Proposed Solutions:

Some difficulties were experienced with collecting the original design info especially the original drainage reports. Multiple sources were approached including the original designer, NJDOT and NJDEP. For those sites the design reports cannot be obtained within the project period, the designs would have to be approximated from the construction plans that have already been obtained.

Year 1 Budget	\$186,080
Years 1 & 2 Cumulative Budget	
Years 1, 2 & 3 Cumulative Budget	
Total Project Budget	\$186,080
Modified Contract Amount:	\$186,080
Total Project Expenditure to date	\$124,166
% of Total Project Budget Expended	66.73%

NJDOT Research Project Manager Concurrence: _____ Date: _____



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

QUARTERLY PROGRESS REPORT

Project Title:	Evaluation of Warm Asphalt Technology		
RFP NUMBER: 2008-01	NJDOT RESEARCH PROJECT MANAGER: Lad Szalaj		
TASK ORDER NUMBER: TO 218 / RU Acct 4-27212	PRINCIPAL INVESTIGATOR: Thomas Bennert		
Project Starting Date: 01/01/2008 Original Project Ending Date: 12/31/2009 Modified Completion Date:	Period Covered: 1 st Quarter 2009		



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Task #	Task	% of Total	Fixed Budget	% of Task this quarter	Cost this quarter	% of Task to date	Total cost to date
1	Mobilization	10.52%	\$ 30,000	0.0%	\$ -	100.0%	\$ 30,000
2	Literature Search	2.88%	\$ 8,200	0.0%	\$ -	100.0%	\$ 8,200
3	Influence of Aggregate Blend Moisture Content	6.96%	\$ 19,840	30.0%	\$ 5,952	100.0%	\$ 19,840
4	Assessment of Compaction of Different WMA's	6.75%	\$ 19,238	50.0%	\$ 9,619	95.0%	\$ 18,276
5	Laboratory Sensitivity on the Gyratory Compaction of WMA's	13.11%	\$ 37,360	50.0%	\$ 18,680	70.0%	\$ 26,152
6	Laboratory Specimen Conditioning for Performance Testing	10.33%	\$ 29,436	5.0%	\$ 1,472	10.0%	\$ 2,944
7	Asphalt Binder Grade Selection	16.08%	\$ 45,835	60.0%	\$ 27,501	85.0%	\$ 38,960
8	Use of RAP	12.37%	\$ 35,250	5.0%	\$ 1,763	10.0%	\$ 3,525
9	In-Project Implementation - Field Trials	13.82%	\$ 39,390	15.0%	\$ 5,909	70.0%	\$ 27,573
10	Final Report and Quarterly Reporting	7.20%	\$ 20,522	0.0%	\$ -	0.0%	\$ -
11		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
12		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
13		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
14		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
15		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
16		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
17		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
18		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
19		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
20		0.00%	\$ -	0.0%	\$ -	0.0%	\$ -
	TOTAL	100.00%	\$ 285,071		\$ 70,895		\$ 175,470

Blue text is entered once at the beginning of the project

Green text is updated ever quarter

Black text is automatically updated or static

Project Objectives:

The objective of NJDOT 2008-01, *Warm Pavement Technology*, is to evaluate the different facets of warm mix asphalt production and performance for future use by the New Jersey Department of Transportation (NJDOT). An assessment of available warm mix additives/technologies will be conducted to provide NJDOT with preliminary recommendations for future use. The assessment will be based on Literature Reviews/Interviews, as well as a detailed laboratory and field research program detailed in this research proposal. This includes critical factors during the laboratory mixture design, as well as critical factors during the production and placement of warm mix asphalt. The research project will also evaluate the potential end uses of warm mix asphalt. This includes the typical use in



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

structural pavements, as well as the potential use for pothole/maintenance mixes that could be used for long haul/long dwell time projects.

Project Abstract:

The research proposal is broken down into a Literature Search and nine major tasks. The research team will evaluate possible modifications to mixture design and analysis procedures for warm mix asphalt. This will be conducted through a literature search and interview process and then using laboratory experiments that address critical areas where hot and warm mix asphalt differ significantly. This includes limits to aggregate moisture, procedure for the selection of WMA and dosage rate, specimen fabrication, binder grade selection, and recycled asphalt materials (RAP). A sensitivity study to provide recommendations as to which WMA's are preferred, as well as to assess the affects of mixture volumetrics after compaction in the gyratory compactor will provide guidance to warm mix additive selection and expected issues with the Superpave volumetric design when using these additives. It is also proposed that a warm mix test trial, designed based on recommendations from the research study, be included as a validation/verification task. It is important to include the field study so a proper comparison can be verified between laboratory and field produced materials. An Implementation Plan at the conclusion of the study will provide a 1-Day Workshop regarding the use of Warm Mix Additives. The workshop will provide procedures and recommendations for warm mix additive selection, mixture design, and quality control procedures. The workshop will be conducted in the state of the art lecture hall facility at CAIT.

1. Progress this quarter by task:

Task 1 - Mobilization

Mobilization for the project has been completed.

Task 2 – Literature Review

The Feasibility/Literature Review was submitted to the NJDOT for view and comments and was eventually accepted. The technical working group (TWG) then gave the official OK to continue with the testing program.

Task 3 – Influence of Aggregate Moisture Content

Task 3 was completed this Quarter and the analysis is being finalized. In summary, the test results indicate that moisture sensitivity (stripping potential) may be an issue when production temperatures are reduced to approximately 270F. This is due to residual moisture remaining in the aggregates from lack of drying. The test results showed:

Hamburg Wheel Track Testing

- Greater levels of stripping potential were found for the higher absorptive aggregates (1.47%) than in the lower absorptive aggregates (0.61%). The worst performing mix, which showed



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

stripping almost immediately, was the higher absorptive aggregate mix at the 270F temperature. This occurred at both the 3% and 6% aggregate blend moisture level.

Tensile Strength Ratio (TSR)

- TSR showed an immediate decrease unless the samples were dry and mixing at a temperature at 315F. A reduction in mixing temperature or the inclusion of moisture reduced the TSR value by over 25%. This data has only been analyzed to date using the lower absorptive aggregates. Analysis is on-going for the higher absorptive aggregates and should be available for presentation.

Task 4 – Compactibility of Different WMA's

Based on the Feasibility Study and new technologies introduced to New Jersey (REVIK), the Compactibility Study has been slightly modified. The study will mainly focus on preblended warm mix additives (Rediset, Sasobit, and REVIK) at different percentages. A number of factors will be evaluated to measure workability/compactibility;

- Casola Method for determining mixing and compaction temperatures of binder modified with the warm mix additives;
- Rotational Viscosity (current standard for Superpave) for determining mixing and compaction temperatures of the binder modified with the warm mix additives;
- Thin-film rheology – recently introduced to asphalt with the work by Gerry Reinke at Mathy Construction, Thin-Film Rheology gives an indication of the lubrication that occurs between aggregates (i.e. – higher the lubrication, the better compaction).
- University of Massachusetts Workability Device – the workability is measured as a function of temperature and torque resistance during mixing. Unlike the previous two tests, this test is conducted on the mixture itself.
- Marshall Compaction Hammer – constant energy is applied to the mix through a constant weight falling at a constant height to a known number of blows. Previous work by Rutgers University has shown the Marshall Hammer to be sensitive enough to temperature/workability to pick up the influence of warm mix additives.
- Gyrotory Compaction – used as a baseline for comparison.

Testing has been completed for the Massachusetts Workability Device, Marshall and Gyrotory compaction. The test results should be available for presentation at the Quarterly Meeting.

Work on the Casola Method needed to be redone due to a test specification change. Testing using the new test specification for the Casola Method will begin shortly.

Data analysis from the Thin-Film Rheology is being completed and Rutgers is awaiting the test results. Specialized testing conducted by Gerry Reinke at Mathy Construction in Wisconsin.



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Task 5 – Laboratory Specimen Preparation Procedure

A majority of the testing will be conducted from the next field trial section. It is required to have plant produced material, along side laboratory produced material, to compare levels of aging (differences to that produced at the plant and that from the lab). However, some samples are being shipped to Rowan University for asphalt binder extraction and recovery work. This will help to verify the aging occurring in the binder.

Task 6 – Asphalt Binder Selection

Information was provided to Rutgers regarding a proposed compaction temperature limit that is based on the Aging Ratio of the asphalt binder, where the aging ratio is defined at G^*_{RTFO}/G^*_{Orig} . After receiving this information, Rutgers contacted both SemMaterials and NuStar, the two most prominent asphalt binder manufacturers in New Jersey, to obtain the general Aging Ratio information for various asphalt binder grades produced by the refineries. A table of the recommended lower limit for compaction temperature without the need to bump the binder grade has been generated and will be presented at the Quarter Meeting. This proposed table will be evaluated in the laboratory using the Asphalt Pavement Analyzer and Flow Number.

Initial Flow Number testing has indicated that there is a distinct reduction in rutting resistance as production temperatures decrease. Slight reductions were noted when going from mixing temperatures of 315F to 265F. However, much larger reductions were noted when the temperatures were once again reduced from 265F to 225F. Results will be presented at the Quarterly Meeting.

Task 7 – Use of Higher RAP Percentages

Work being conducted on the I78 and NYSDOT LEA projects indicated that RAP may actually help, in some cases, resisting the potential for stiffness reduction due to a reduction in production temperatures (up to 25%). Further analysis is being planned for next quarter.

Task 8 – Field Trials

Testing was completed on the I78 Warm Mix project. Analysis is being completed and is hopeful to be presented at the Quarterly Meeting.

2. Proposed activities for next quarter by task:
3. List of deliverables provided in this quarter by task (product date):
4. Progress on Implementation and Training Activities:
5. Problems/Proposed Solutions:



CAIT

Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

Year 1 Budget	\$166,385
Years 1 & 2 Cumulative Budget	\$285,071
Years 1, 2 & 3 Cumulative Budget	
Total Project Budget	\$ 285,071
Modified Contract Amount:	
Total Project Expenditure to date	\$ 175,470
% of Total Project Budget Expended	61.6%

NJDOT Research Project Manager Concurrence: _____ Date: _____